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## United States Patent [19]

Ralph et al.

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[54] **POLYAXIAL PEDICLE SCREW HAVING A  
THREADED AND TAPERED COMPRESSION  
LOCKING MECHANISM**

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## Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 663,383, Jun. 13, 1996, Pat.  
No. 5,669,911, which is a continuation-in-part of Ser. No.  
421,087, Apr. 13, 1995, Pat. No. 5,520,690.

[51] Int. Cl.<sup>6</sup> ..... A61B 17/70

[52] U.S. Cl. .... 606/61; 606/73

[58] Field of Search ..... 606/61, 60, 72,  
606/73, 69, 70, 71; 623/17

## [56] References Cited

## U.S. PATENT DOCUMENTS

5,207,678	5/1993	Harms et al. ....	606/61
5,443,467	8/1995	Biedermann et al. ....	606/65
5,520,690	5/1996	Errico et al. ....	606/61
5,607,426	3/1997	Ralph et al. ....	606/61

5,669,911 9/1997 Errico et al. .... 606/61

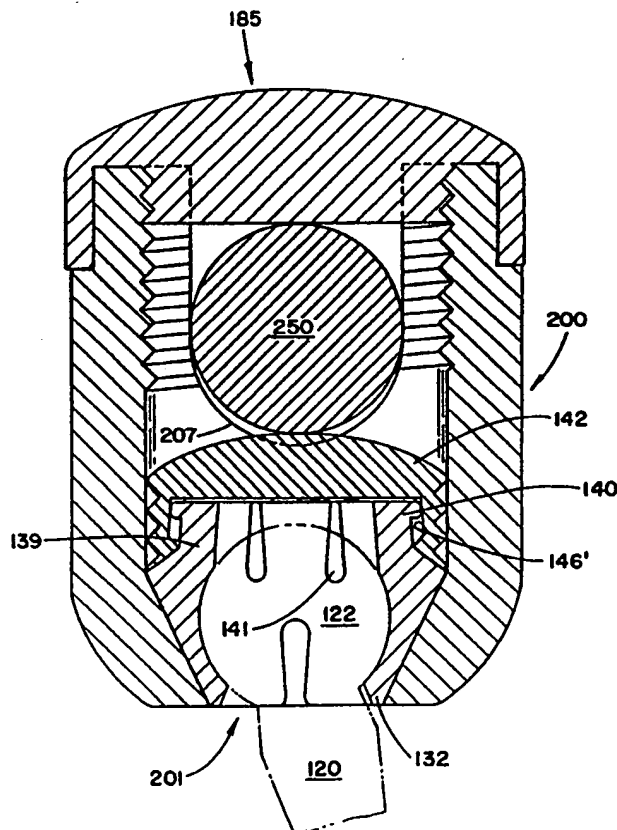
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## [57] ABSTRACT

A polyaxial orthopedic device for use with rod implant apparatus includes a screw having a curvate head, a two-piece interlocking coupling element which mounts about the curvate head, and a rod receiving cylindrical body member having a tapered socket into which both the screw and the interlocking coupling element are securely nested. The interlocking coupling element includes a socket portion which is slotted and tapered so that when it is radially compressed by being driven downwardly into the tapered socket in the cylindrical body it crush locks to the screw. The securing of the rod in the body member provides the necessary downward force onto the socket portion through a contact force on the top of the cap portion. Prior to the rod being inserted, therefore, the screw head remains polyaxially free with respect to the coupling element and the body. In a preferred embodiment, the cap portion and the socket portion are formed and coupled in such a way that when the cap portion is compressed toward the socket portion, there is an additional inward radial force applied by the cap portion to the socket portion, thereby enhancing the total locking force onto the head of the screw.

11 Claims, 9 Drawing Sheets



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